

Anatomy of the Knee:

-Modified hinge joint, diarthrodial,

-Consists of 3 components:

1-Distal articular surface of the femur,

2-Proximal articular surface of the tibia

3-The articular surface of the patella

**Superior Tibiofibular joint isn't a part of the knee

-Patella is a sesamoid bone attached distally to the patellar tendon & proximally to quadriceps tendon

Ligaments of the knee:

1-Lateral collateral ligament: from the lateral epicondyle of the femur to the head of the fibula

Function: main constraint of the varus movement of the knee

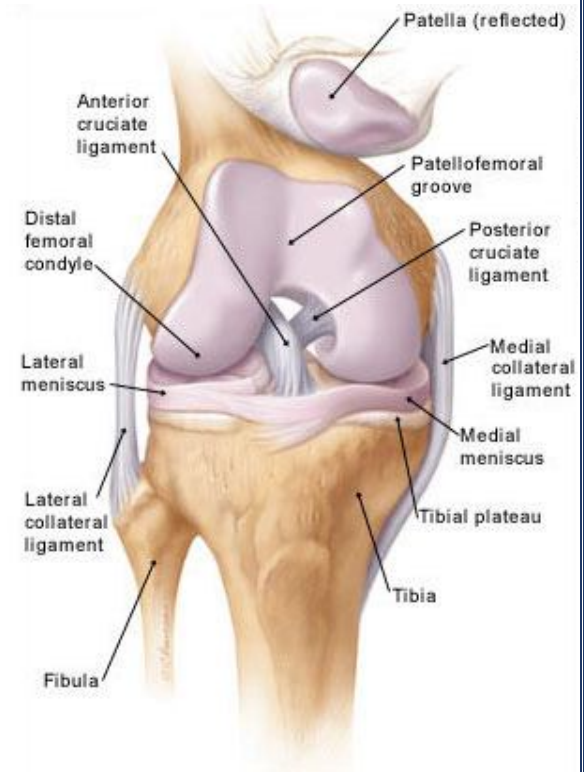
2-Medial collateral ligament: from medial epicondyle of femur to the proximal anteromedial of the tibia

Function: prevent valgus strain

3-Anterior Cruciate ligament 4-Posterior Cruciate ligament

Function: prevent anterior translation and medial rotation of the tibia, in relation to the femur

5-Medial Meniscus (C shaped) 6-Lateral Meniscus (O shaped)



A) Bony Fractures:

1-Fracture of the Tibial plateau:

Schatzker classification:

Type 1	Lateral Tibial plateau split without depression
Type 2	Lateral tibial plateau split with depression
Type 3	Pure lateral tibial plateau depression
Type 4	Pure medial tibial plateau depression
Type 5	Bicondylar tibial plateau fracture
Type 6	Split extends to metadiaphysis

Methods of fixation

Lag screws (Percutaneous or Open)
Plateau elevation via window + Bone Graft + Screw(s) ± Plate
According to skin condition Good → Bilat. plate / Bad → Ext. fix.

Mechanism of injury: Motor car accident – Falling from height

Axial loading + stress on the articular surface of the tibia with valgus/varus

Fracture may be accompanied by:

-Knee effusion -Hemoarthrosis -Ligamentous injury -Vascular injury to Popliteal Trifurcation

-Nerve injury of common peroneal nerve (foot drop & loss of sensation at the 1st web space)

Complications: 1-Mal-union 2-Osteoarthritis 3-Stiffness of knee joint 4-Infections

5-Hardware failure 6-Skin breakdown & necrosis 7-Ischemia & Compartment syndrome

2-Fracture of the Tibial Spine & Inter-condylar Eminence:

Classification:

Type 1	Non-displaced
Type 2	Partially displaced
Type 3a	Completely displaced
Type 3b	Displaced + Rotated

Method of Fixation

Conservative (above knee cast in extension)
If displacement > 2 ml → Pull-out suture or Biodegradable screws or Herbert screw or K-wires (Kirschner)

3-Fractures of the Patella:

Functions of the patella: -It protects the knee anteriorly

-It's the largest sesamoid bone → increasing the lever arm of the extensor mechanism

-It smoothens the gliding movement of the extensor mechanism and prevents secondary osteoarthritis

Classification:

Method of fixation

Stable (Undisplaced)	Cylinder cast in extension
Unstable (e.g. Transverse)	Tension Band Principle (Cerclage)

B) Soft Tissue Injury:

1-Rupture of Quadriceps tendon:

C/P: -Patient cannot extend knee except if the rupture is incomplete

*Pathological rupture of the tendon due to inflammation of the tendon (Tendinosis) occurs in immunocompromised patients (e.g DM)

TTT: Repair of the tendon, in neglected rupture → Z-plasty or V-Y-plasty

2-Medial Collateral ligament Injury:

Mechanism of Injury: Valgus stress to a slightly bent knee

Grades:

Grade I	Partial tear (sprain) of the MCL with minimal symptoms
Grade II	Near complete tear, some Instability (esp. in pivot movement)
Grade III	Complete tear of the MCL, Giving out instability

Treatment:

-General measures: (Resting from activity - Icing the injury - Anti-inflammatory medications)

-Surgery only if there is persistent knee instability

3-Anterior Cruciate Ligament Tear:

Mechanism of injury: Sports involving cutting and jumping (e.g. Basketball – American football)

Occurs due to Acceleration-Deceleration or Maximum sudden flexion

C/P: Giving away knee during walking – severe pain at once + massive knee effusion

Diagnosis: Anterior Drawer test – Lachman test – Pivot shift test

DD of hemoarthrosis as a result of trauma (Q) 1-ACL tear 2-Peripheral Meniscal tear

TTT: Reconstruction Surgery using Autograft or Allo-graft

*Autografts: -BPTB i.e Bone Patellar Tendon Bone graft -Hamstring graft

4-Meniscal Tear:

Meniscus function: -More matching of the Tibial proximal articular surface to the distal femoral condyles

-Cushioning function to give more resilient movement

Meniscus is divided into 3 Zones:

1-Red: outer $\frac{1}{3}$, highly vascular 2-Red-White: middle $\frac{1}{3}$, less vascular 3-White: inner $\frac{1}{3}$, avascular

Types of tear:

1-Peripheral Tear (In Red zone): No surgery needed

2-Bucket-handle tear: peripheral tear increased medially

3-Displaced Bucket-handle tear: Surgical emergency (Knee is locked + severe agonizing pain)

Treatment:

1-Meniscal Repair using Anchors or Sutures

2-Menisectomy

3-Meniscal Transplant using Allograft